Apprentice Instruction in the Manila Bureau of Printing

A description of a new system of
coöperative vocational train-
ing and what it has
accomplished

By
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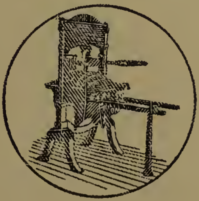

Reprinted from
THE PHILIPPINE CRAFTSMAN
November, 1912
(SECOND PRINTING)

MANILA
BUREAU OF PRINTING
1913

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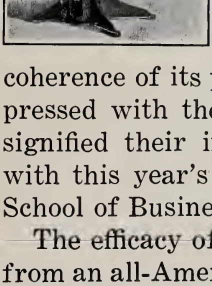
The accompanying article refers to the Leech system of vocational training, originated by John S. Leech, Director of Printing, and successfully applied in the Government Printing Office of the Philippine Islands

WE ARE LEARNING THAT INDUSTRIAL PROSPERITY DEPENDS IN THE LONG RUN ON A KIND OF EFFICIENCY THAT AGGREGATIONS OF CAPITAL, HOWEVER IMPOSING, CAN NOT BY THEMSELVES SUPPLY, AND THAT IN VERY MANY OF THE MOST DESIRABLE INDUSTRIES THE SECRET OF SUCCESS IS IN THE TRAINED INTELLIGENCE AND DISCIPLINED TASTE OF THE MAN WHO DOES THE WORK; THAT THE DEVELOPMENT OF THESE POWERS IN THE WORKMEN OF THE FUTURE IS AN IMPORTANT BRANCH OF GENERAL EDUCATION, AND ITS ACTIVE PROMOTION AND ADEQUATE SUPPORT A LEGITIMATE PUBLIC CONCERN. —LESLIE W. MILLER.

The Bureau of Printing, Manila

SYSTEM OF APPRENTICE INSTRUCTION IN THE MANILA BUREAU OF PRINTING

By Samuel H. Musick, *Craftsman Instructor, Bureau of Printing*



THE Manila Bureau of Printing has instituted a system of apprentice instruction which is a radical departure from all known methods of vocational training. The practicability of its scheme has received world-wide approval. Leaders in the graphic arts and instructors in institutions devoted solely to teaching printing and its allied trades have expressed admiration at the fullness of its details and the coherence of its parts. Instructors in Harvard University, impressed with the thoroughness of the Bureau's system, have signified their intention of using its material in connection with this year's course in printing in the Harvard Graduate School of Business Administration.

The efficacy of the system is best evidenced by the evolution from an all-American force in 1902 to the present one composed

The printed word is the greatest contribution to man's storehouse of knowledge. The gift of knowledge is man's inalienable possession. Its benefits can be freely imparted, but its substance can not be bartered or given away

of 94 per cent of Filipino workmen. Of this native element, apprentices constitute 63.63 per cent. All of the mechanical work of the Bureau of Printing is being performed by Filipinos, Americans acting only in a supervisory capacity.

Apprentice instruction places the Bureau of Printing in a position unique among the world's printing offices. No other public or private *producing* establishment in existence is operated with so large a percentage of students comprising its technical force. In American and European printing offices the apportionment of apprentices to journeymen is on a basis of from 1-to-15 to 1-to-5, whereas in the Bureau of Printing the present ratio is $1\frac{3}{4}$ apprentices to 1 native craftsman.

The Bureau, however, is not primarily a school of printing. It furnishes all the printing and binding for the Philippine Government and certain work for local stations of the United States Army and Navy. Among its customers are the various Insular bureaus and offices, the Philippine Legislature, 38 provinces, and 725 municipalities. Its modern equipment consists in part of twenty linotypes; thirty cylinder, platen, embossing, and automatic printing presses; fifty bookbinding machines; twenty-five stereotyping and electrotyping machines; a photo-engraving plant equipped for line, half-tone, and color-process engravings; a machine shop; and a power plant in duplicate. The plant is valued at ₱1,000,000.

A Battery of Linotypes, Composing Division, with Filipino Operators

During the last decade the business of printing and publish-

The printing press is the great contributing factor to the progress of the human race. The industrial success and intellectual advancement of all nations may be measured by the quantity and quality of their printed matter

ing has advanced from a comparatively obscure position to sixth place among American industries. In 1909 its products were valued at ₱1,500,000,000.

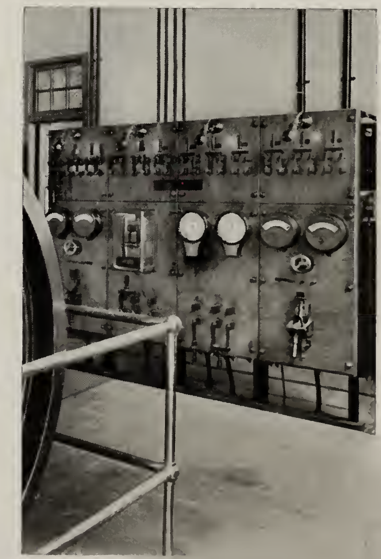
Printing courses have been established in public and private schools in several cities of the United States, and there is now pending in Congress a measure which provides that the Government shall establish and exercise control over trade schools in all parts of the country.

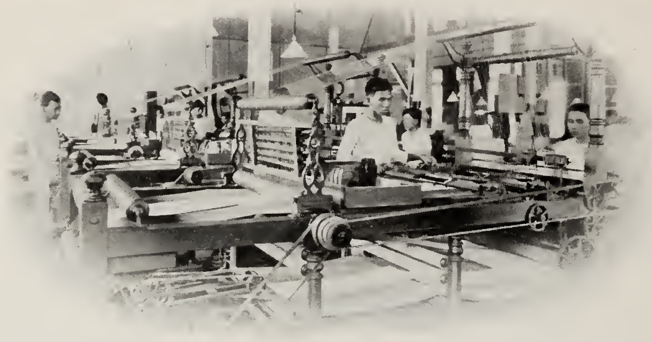
The Bureau of Printing system of vocational training is commercially practicable in that it may be introduced into any manufacturing plant without any perceptible change in its routine, and apprentices may be paid wages from the date of the beginning of their apprenticeship. It is effective because it has standardized technical training by the adoption of a concise but comprehensive method of instruction, imparted in the orderly progression of an invariable schedule.

Its principle, briefly, is this: The operations of each trade are segregated into specialties and subspecialties. These are divided into classes in the order of their relative importance, forming a systematic and coördinate sequence of instruction. A progressive schedule is thus provided—a step-by-step advancement which is as necessary to the proper industrial education of a boy as are the finger exercises in the acquirement of the finished technique of the expert musician.

The manner in which the specialties and subspecialties are

Marble Switchboard, Power Plant Division
Erected by Apprentices





Ruling Machines in the Bindery

arranged for each of the eight trades taught in the Bureau of Printing is shown in Plates I and II. Numbers are assigned to specialties and letters to subspecialties. Plates I and II pertain to the photo-engraving trade, which is divided into 41 specialties and 154 subspecialties.[1] The same general scheme is applied to each of the trades, the number of specialties and subspecialties in each division being as follows:

Trade.	Specialties.	Subspecialties.	Total.
Printer	47	258	305
Pressman	45	136	181
Bookbinder	74	196	270
Photo-engraver	41	154	195
Stereotyper and electrotyper	40	140	180
Total	247	884	1,131

Fifty-five specialties and 265 subspecialties are taught in the

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[1] In explanation of the hiatus from 32 to 101, it may be stated that the numbers assigned to specialties are the same for both the apprenticeship and cost-accounting systems of the Bureau, viz, 1 to 100, inclusive, for chargeable specialties; 101 and upward for nonchargeable specialties. A further division of chargeable specialties is made in those divisions having both machine and hand specialties, as follows: Machine, 1 to 50, inclusive; hand, 51 to 100, inclusive. This system of numbering enables the abstractor to make all entries from the workman's daily time ticket (Plate III) without reference to an explanatory list of specialties; and its advantages will be apparent when it is understood that machine and hand rates are segregated and that nonchargeable specialties ordinarily are not abstracted.

Graduate Apprentices As Operators

auxiliary trades of engineer, machinist, and electrician, making a grand total of 302 specialties and 1,149 subspecialties in the eight trades mentioned.

The specialties of each trade are distributed over seven periods, or four years in all. During the first three years (six periods of six months each) the student is designated as an "apprentice," and in the final period of one year he is known as a "junior craftsman." This provides ample time in which the student may familiarize himself with each specialty of the trade. It is not contended that within that time a superior workman can be evolved from the crude material, but the four-year period of systematic instruction has proven adequate for turning out workmen who have assimilated a general knowledge of all the specialties of their trades. Graduate apprentices are also given opportunities to demonstrate their fitness for the positions of copy editor, proof reader, work-order writer, computer, estimator, and such other assignments as require workmen of wide experience. A comprehensive technical reference library, available to all, affords an excellent medium for self-education in office administration and organization, the relations of the various printing trades to each other, and the physical qualities of the more important printing-office materials. The value of the information contained in this library is impressed upon the mind of the apprentice, and he is urged to consult it freely.

Bureau of Printing apprentices have a distinct advantage in not being required to devote any part of their time to running errands, "sweeping out," and other tasks that usually occupy the greater part of the first year of apprentices elsewhere.

Although this is an age of specialization, it is believed that the most efficient workman is one trained in all of the operations pertaining to his trade, making him more adaptable as a competent specialist. This method also provides a mobile force, advantageous alike to employer and employee.

A Class 6 Apprentice

A system of instruction whereby each workman becomes thoroughly conversant with all of the details of his trade makes him superior to that neglected class which is subjected to a monotonous grind on one class of work. It places him thoroughly in line with the principles of so-called scientific management, because during his apprenticeship he unconsciously acquires much of what such systems are now endeavoring to establish.

The first class period of six months is considered ample in which to determine an apprentice's fitness for the trade to which he has been assigned. If he shows inaptitude, particularly with respect to mechanical details, he is advised to seek other fields of labor. Justice to the employee as well as to the employer demands frankness in a matter that influences the formative period of a boy's life. If an apprentice demonstrates aptitude during his first class period but is unable to qualify for promotion within the prescribed period of six months, he is retained in the class until he has thoroughly mastered the specialties of that class period. The extension, however, in no case exceeds three months. If, after three months' extension, an apprentice fails to qualify for

Imposing Forms for Press

promotion, he is separated from the service. It has been demonstrated that changing an apprentice's classification, with a corresponding increase in compensation, confers a mark of distinction and gives him an incentive to maintain his interest in the work. As new kinds of work are introduced at the beginning of each class period, it may readily be surmised that an apprentice will put forth his best efforts to master the specialties of his current class in order to advance from the monotony of a class-end period to the welcome change afforded by new duties.

A Row of Platen Presses

A prerequisite to the success of any apprenticeship system is the employment of instructors who are thoroughly skilled in their work. They must have not only unusual ability and the faculty of imparting their knowledge, but also, what is more important, the disposition to impart that knowledge in the freest manner and to the fullest extent.

In the Bureau of Printing the attitude of a craftsman instructor toward an apprentice is similar to that of a teacher and pupil in a school. The instructor instills into the mind of the student the importance of exerting every effort toward attaining efficiency. The apprentice is given a scheduled task and shown the proper manner in which it should be performed. He is never permitted to become a mere animated machine. Instructors take a personal interest in the work of each apprentice, carefully explaining every operation. The apprentice is never forced to acquire his knowledge through chance contact with other workmen.

Some of the Cylinder Presses

A competent craftsman instructor or supervisor should be

[*Continued on page 14*

PLATE I

MANNER IN WHICH ALL OPERATIONS OF EACH TRADE ARE SEGREGATED INTO SPECIALTIES AND SUBSPECIALTIES. THE EIGHT TRADES TAUGHT IN THE BUREAU OF PRINTING CONSIST OF 302 SPECIALTIES AND 1,149 SUBSPECIALTIES. INSTRUCTION IN EACH TRADE IS IMPARTED ACCORDING TO AN INVARIABLE SCHEDULE (SEE PLATE II)

PHOTO-ENGRAVING SPECIALTIES

CHARGEABLE

1. Alterations.
2. Anchoring:
   - (*a*) Drilling anchor holes.
   - (*b*) Countersinking anchor holes.
   - (*c*) Outlining anchor marks.
   - (*d*) Tinning anchor marks.
   - (*e*) Casting anchors.
3. Beveling, plain:
   - (*a*) Adjusting mechanism.
   - (*b*) Aligning plate with line gauge and clamping down.
   - (*c*) Beveling, leaving plain border.
   - (*d*) Cutting graved or white line.
   - (*e*) Beveling, leaving black and white line border.
4. Beveling, special (lining):
   - (*a*) Adjusting mechanism.
   - (*b*) Aligning plate with line gauge.
   - (*c*) Cutting black and white lines in multiple or extended lines.
   - (*d*) Making raised border line by burring up.
   - (*e*) Cutting raised line down to printing surface and graving white line.
   - (*f*) Beveling.
5. Blocking or mounting:
   - (*a*) Adjusting mechanism.
   - (*b*) Center punching for countersinks.
   - (*c*) Drilling countersinks for tack heads.
   - (*d*) Planing blocking wood smooth on one side.
   - (*e*) Nailing cuts to blocks.
   - (*f*) Planing mounts type high.
   - (*g*) Trimming and squaring blocks.
   - (*h*) Sandpapering corners and raw edges.
   - (*i*) Routing out large blanks.
   - (*j*) Blocking or mounting to register.
6. Cut outs:
   - (*a*) Tooling outline.
   - (*b*) Routing.
   - (*c*) Trimming.
7. Cutting circles or ovals:
   - (*a*) Cutting cardboard mat to size.
   - (*b*) Trimming negative by mat.
   - (*c*) Tooling outline.
   - (*d*) Routing.
   - (*e*) Trimming.
8. Drawing (illustrating, designing, lettering):
   - (*a*) Pen.
   - (*b*) Wash.
   - (*c*) Air brush.
   - (*d*) Colors.
   - (*e*) Preparing black and white copy for color reproductions.
   - (*f*) Coloring transparencies.
9. Etching, copper, half-tone:
   - (*a*) Flat etch.
   - (*b*) Staging and reëtching.
   - (*c*) Trial proof.
   - (*d*) Preparing and mixing etching solutions.
10. Etching, copper, line:
    - (*a*) Etching line print.
    - (*b*) Retouching etching.
    - (*c*) Powdering and burning in line work.
    - (*d*) Preparing and mixing etching solutions.
11. Etching, half-tone, color:
    - (*a*) Flat etch.
    - (*b*) Trial proof.
    - (*c*) Staging and reëtching.
    - (*d*) Preparing and mixing etching solutions.
12. Etching, zinc, half-tone:
    - (*a*) Flat etch.
    - (*b*) Staging and reëtching.
    - (*c*) Trial proof.
    - (*d*) Preparing and mixing etching solutions.
13. Etching, zinc, line.
    - (*a*) Etching line print.
    - (*b*) Retouching etching.
    - (*c*) Powdering and burning in line work.
    - (*d*) Preparing and mixing etching solutions.
14. Finishing, half-tone:
    - (*a*) Spotting.
    - (*b*) Extending corner lines.
    - (*c*) Burnishing.
15. Finishing, half-tone, color:
    - (*a*) Spotting.
    - (*b*) Extending corner lines.
    - (*c*) Burnishing.
    - (*d*) Outlining for cut outs.
    - (*e*) Trimming cut outs.
    - (*f*) High-lighting.
16. Finishing, line:
    - (*a*) Spotting.
    - (*b*) Trimming.
    - (*c*) Repairing.
    - (*d*) Correcting.
17. Mortising:
    - (*a*) Adjusting mechanism.
    - (*b*) Outside mortising.
    - (*c*) Inside mortising.
18. Mounting or grouping original copy:
    - (*a*) Grouping of copy for half-tone reproduction.
    - (*b*) Grouping negatives for printing.
    - (*c*) Grouping or arranging objects for half-tone reproduction, color work, and dry-plate photography.
19. Photographing, color operating; making color record negatives:
    - (*a*) Color sensitizing dry plates.
    - (*b*) Focusing color copy.
    - (*c*) Exposing color sensitized plates through color filters.
    - (*d*) Developing record negatives.
    - (*e*) Clearing and fixing record negatives.
    - (*f*) Intensifying record negatives.
    - (*g*) Reducing record negatives.
    - (*h*) Printing transparencies from record negatives.
    - (*i*) Developing transparencies.
    - (*j*) Clearing and fixing transparencies.
    - (*k*) Intensifying transparencies.
    - (*l*) Reducing transparencies
    - (*m*) Preparing dye solutions for color sensitizing.
    - (*n*) Preparing and mixing chemicals.
20. Photographing, dry-plate work:
    - (*a*) Interior views.
    - (*b*) Outside views.
    - (*c*) Copying prints, enlargement or reduction.
    - (*d*) Preparing copy from colored pictures or objects for half-tone reproduction.
    - (*e*) Making transparencies.
    - (*f*) Mounting prints.
    - (*g*) Preparing and mixing chemicals.
21. Photographing, half-tone:
    - (*a*) Focusing copy.
    - (*b*) Collodionizing and sensitizing plates.
    - (*c*) Adjusting screen.
    - (*d*) Placing plate in plate holder and timing exposure.
    - (*e*) Developing negative.
    - (*f*) Clearing negative.
    - (*g*) Intensifying negatives.
    - (*h*) Clearing and cutting negative with cyanide.
    - (*i*) Final intensification.
    - (*j*) Preparing and mixing chemicals.
22. Photographing, half-tone, special (reproduction of pencil drawings, etchings, and steel or copperplate prints).
23. Photographing, line:
    - (*a*) Focusing line.
    - (*b*) Collodionizing and sensitizing plate.
    - (*c*) Placing plate in plate holder and timing exposure.
    - (*d*) Developing negative.
    - (*e*) Clearing out developer with cyanide.
    - (*f*) Intensifying negative.
    - (*g*) Clearing negative.
    - (*h*) Final intensification.
    - (*i*) Final clearing.
24. Printing negatives:
    - (*a*) Sawing and polishing metal.
    - (*b*) Coating metal with sensitizing solution.
    - (*c*) Printing negatives.
    - (*d*) Rolling up print.
    - (*e*) Washing and developing out plate after printing.
    - (*f*) Burning or baking in enamel.
    - (*g*) Retouching print.
    - (*h*) Preparing and mixing line and half-tone printing solutions.
25. Proofing:
    - (*a*) Black and white.
    - (*b*) Color.
26. Reëngraving.
27. Retouching:
    - (*a*) Copy.
    - (*b*) Negatives.
    - (*c*) Plates.
28. Routing:
    - (*a*) Adjusting mechanism.
    - (*b*) Line work.
    - (*c*) Half-tone cut out work.
    - (*d*) Sharpening router bits.
29. Stripping negatives:
    - (*a*) Coating negatives with rubber.
    - (*b*) Coating negatives with collodion.
    - (*c*) Cutting and squaring negative film.
    - (*d*) Stripping, reversing, and transferring negative film to plate glass.
    - (*e*) Preparing and mixing stripping solutions.
30. Transparencies.
31. Vignetting:
    - (*a*) Outlining.
    - (*b*) Tooling.
    - (*c*) Etching.
    - (*d*) Routing.
    - (*e*) Trimming.
    - (*f*) Underlaying.
32. Zinc overlays:
    - (*a*) Cutting zinc to size.
    - (*b*) Cleaning and polishing.
    - (*c*) Drying.
    - (*d*) Pulling offset on zinc.
    - (*e*) Retouching zinc offset.
    - (*f*) Powdering and burning in.
    - (*g*) Etching.

NONCHARGEABLE

101. Cleaning machinery.
102. Corrections, office.
103. Instructing apprentices.
104. Laborer.
105. Mixing and preparing chemicals.
106. Practice work.
107. Supervising, inspecting finished product, and similar work.
108. Waiting for repairs (write name of machine.)
109. Waiting for work (will not be allowed unless employee reports immediately to the Foreman).

TO make the workman of the future an intelligent craftsman and self-reliant citizen was our hope; to build a man rather than gain a dollar, our ideal. That both our hope and our ideal by patience and study have borne the fruit of achievement, is our reward.

PLATE II

SHOWING THE MANNER IN WHICH SPECIALTIES AND SUBSPECIALTIES ARE DIVIDED INTO CLASSES IN THE ORDER OF THEIR RELATIVE IMPORTANCE, MAKING A SYSTEMATIC AND COÖRDINATE SEQUENCE OF INSTRUCTION

APPRENTICE

THREE YEARS, DIVIDED INTO SIX CLASSES OF SIX MONTHS EACH

Class 6 (Entrance).

24. Printing negatives [line]:
   (*a*) Sawing and polishing metal.
   (*b*) Coating metal with sensitizing solution.
   (*c*) Printing negatives.
   (*d*) Rolling up print.
   (*e*) Washing and developing out plate after printing.
   (*f*) Burning or baking in enamel.
   (*g*) Retouching print.
   (*h*) Preparing and mixing line and half-tone printing solutions.
13. Etching, zinc, line:
   (*a*) Etching line print.
   (*b*) Retouching etching.
   (*c*) Powdering and burning in line work.
   (*d*) Preparing and mixing etching solutions.
5. Blocking or mounting:
   (*a*) Adjusting mechanism.
   (*b*) Center punching for countersinks.
   (*c*) Drilling countersinks for tack heads.
   (*d*) Planing blocking wood smooth on one side.
   (*e*) Nailing cuts to blocks.
   (*f*) Planing mounts type high.
   (*g*) Trimming and squaring blocks.
   (*h*) Sandpapering corners and raw edges.
   (*i*) Routing out large blanks.
   (*j*) Blocking or mounting to register.
105. Mixing and preparing chemicals.

Class 5.

28. Routing:
   (*a*) Adjusting mechanism.
   (*b*) Line work.
   (*c*) Half-tone cut out work.
   (*d*) Sharpening router bits.
17. Mortising:
   (*a*) Adjusting mechanism.
   (*b*) Outside mortising.
   (*c*) Inside mortising.
29. Stripping negatives [line]:
   (*a*) Coating negatives with rubber.
   (*b*) Coating negatives with collodion.
   (*c*) Cutting and squaring negative film.
   (*d*) Stripping, reversing, and transferring negative film to plate glass.
   (*e*) Preparing and mixing stripping solutions.
105. Mixing and preparing chemicals.

Class 4.

24. Printing negatives [half-tone]:
   (*a*) Sawing and polishing metal.
   (*b*) Coating metal with sensitizing solution.
   (*c*) Printing negatives.
   (*e*) Washing and developing out plate after printing.
   (*f*) Burning or baking in enamel.
   (*g*) Retouching print.
   (*h*) Preparing and mixing line and half-tone printing solutions.
32. Zinc overlays:
   (*a*) Cutting zinc to size.
   (*b*) Cleaning and polishing.
   (*c*) Drying.
   (*d*) Pulling offset on zinc.
   (*e*) Retouching zinc offset.
   (*f*) Powdering and burning in.
   (*g*) Etching
10. Etching, copper, line:
   (*a*) Etching line print.
   (*b*) Retouching etching.
   (*c*) Powdering and burning in line work.
   (*d*) Preparing and mixing etching solutions.
105. Mixing and preparing chemicals.

Class 3.

29. Stripping negatives [half-tone]:
   (*a*) Coating negatives with rubber.
   (*b*) Coating negatives with collodion.
   (*c*) Cutting and squaring negative film.
   (*d*) Stripping, reversing, and transferring negative film to plate glass.
   (*e*) Preparing and mixing stripping solutions.
18. Mounting or grouping original copy:
   (*b*) Grouping negatives for printing.
12. Etching, zinc, half-tone:
   (*a*) Flat etch.
   (*b*) Staging and reëtching.
   (*c*) Trial proof.
   (*d*) Preparing and mixing etching solutions.
3. Beveling, plain:
   (*a*) Adjusting mechanism.
   (*b*) Aligning plate with line gauge and clamping down.
   (*c*) Beveling, leaving plain border.
   (*d*) Cutting graved or white line.
   (*e*) Beveling, leaving black and white line border.
4. Beveling, special (lining):
   (*a*) Adjusting mechanism.
   (*b*) Aligning plate with line gauge.
   (*c*) Cutting black and white lines in multiple or extended lines.
   (*d*) Making raised border line by burring up.
   (*e*) Cutting raised line down to printing surface and graving white line.
   (*f*) Beveling.
16. Finishing, line:
   (*a*) Spotting.
   (*b*) Trimming.
   (*c*) Repairing.
   (*d*) Correcting.
25. Proofing:
   (*a*) Black and white.
105. Mixing and preparing chemicals.

Class 2.

1. Alterations.
2. Anchoring:
   (*a*) Drilling anchor holes.
   (*b*) Countersinking anchor holes.
   (*c*) Outlining anchor marks.
   (*d*) Tinning anchor marks.
   (*e*) Casting anchors.
9. Etching, copper, half-tone:
   (*a*) Flat etch.
   (*b*) Staging and reëtching.
   (*c*) Trial proof.
   (*d*) Preparing and mixing etching solutions.
27. Retouching:
   (*c*) Plates.
14. Finishing, half-tone:
   (*a*) Spotting.
   (*b*) Extending corner lines.
   (*c*) Burnishing.
6. Cut outs:
   (*a*) Tooling outline.
   (*b*) Routing.
   (*c*) Trimming.
7. Cutting circles or ovals:
   (*a*) Cutting cardboard mat to size.
   (*b*) Trimming negative by mat.
   (*c*) Tooling outline.
   (*d*) Routing.
   (*e*) Trimming.
31. Vignetting:
   (*a*) Outlining.
   (*b*) Tooling.
   (*c*) Etching.
   (*d*) Routing.
   (*e*) Trimming.
   (*f*) Underlaying.
105 Mixing and preparing chemicals.

Class 1.

23. Photographing, line:
   (*a*) Focusing line.
   (*b*) Collodionizing and sensitizing plates.
   (*c*) Placing plate in plate holder and timing exposure.
   (*d*) Developing negative.
   (*e*) Clearing out developer with cyanide.
   (*f*) Intensifying negative.
   (*g*) Clearing negative.
   (*h*) Final intensification.
   (*i*) Final clearing.
21. Photographing, half-tone:
   (*a*) Focusing copy
   (*b*) Collodionizing and sensitizing plates.
   (*c*) Adjusting screen.
   (*d*) Placing plate in plate holder and timing exposure.
   (*e*) Developing negative.
   (*f*) Clearing negative.
   (*g*) Intensifying negatives.
   (*h*) Clearing and cutting negative with cyanide.
   (*i*) Final intensification.
   (*j*) Preparing and mixing chemicals.
18. Mounting or grouping original copy:
   (*a*) Grouping of copy for half-tone reproduction.
22. Photographing, half-tone, special (reproduction of pencil drawings, etchings, and steel or copperplate prints).
105. Mixing and preparing chemicals.

JUNIOR CRAFTSMAN

ONE YEAR

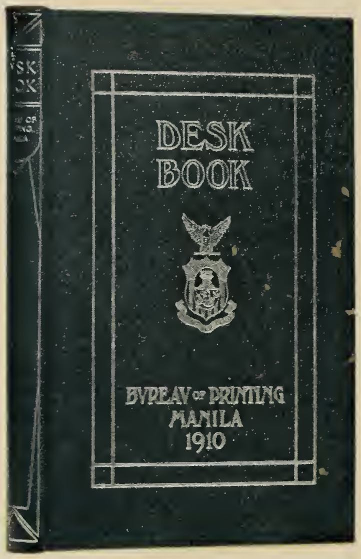
This period shall be devoted to a review of the work of apprenticeship. In addition, elementary work shall be done on the following specialties should there be sufficient work to afford the opportunity and the junior craftsman have demonstrated more than average proficiency in all of his previous work.

20. Photographing, dry-plate work:
   (*a*) Interior views.
   (*b*) Outside views.
   (*c*) Copying prints, enlargement or reduction.
   (*d*) Preparing copy from colored pictures or objects for half-tone reproduction.
   (*e*) Making transparencies.
   (*f*) Mounting prints.
   (*g*) Preparing and mixing chemicals.
18. Mounting or grouping original copy:
   (*c*) Grouping or arranging objects for half-tone reproduction, color work, and dry-plate photography.
30. Transparencies.
27. Retouching:
   (*a*) Copy
   (*b*) Negatives.

19. Photographing, color operating; making color record negatives:
   (*a*) Color sensitizing dry plates.
   (*b*) Focusing color copy.
   (*c*) Exposing color sensitized plates through color filters.
   (*d*) Developing record negatives.
   (*e*) Clearing and fixing record negatives.
   (*f*) Intensifying record negatives.
   (*g*) Reducing record negatives.
   (*h*) Printing transparencies from record negatives.
   (*i*) Developing transparencies.
   (*j*) Clearing and fixing transparencies.
   (*k*) Intensifying transparencies.
   (*l*) Reducing transparencies.
   (*m*) Preparing dye solutions for color sensitizing.
   (*n*) Preparing and mixing chemicals.
11. Etching, half-tone, color:
   (*a*) Flat etch.
   (*b*) Trial proof.
   (*c*) Staging and reëtching.
   (*d*) Preparing and mixing etching solutions.

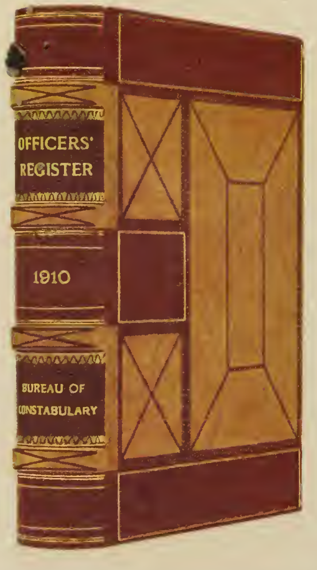
15. Finishing, half-tone, color:
   (*a*) Spotting.
   (*b*) Extending corner lines.
   (*c*) Burnishing.
   (*d*) Outlining for cut outs.
   (*e*) Trimming cut outs.
   (*f*) High-lighting.
25. Proofing.
   (*b*) Color.
26. Reëngraving.
8. Drawing (illustrating, designing, lettering):
   (*a*) Pen.
   (*b*) Wash.
   (*c*) Air brush.
   (*d*) Colors.
   (*e*) Preparing black and white copy for color reproductions.
   (*f*) Coloring transparencies.
105. Mixing and preparing chemicals.

REPRODUCTIONS OF BOOKBINDINGS IN NATURAL COLORS

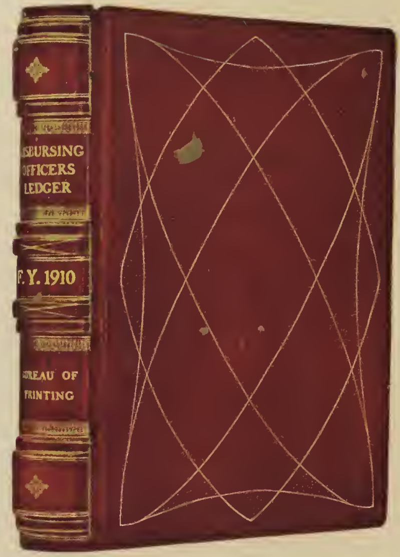


FULL TEXODERM

HALF-BOUND RUSSIA, MARBLE PAPER SIDES

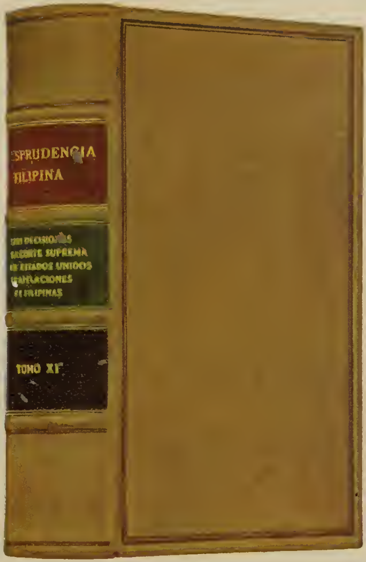


FULL BOUND, RUSSIA ENDS AND BANDS

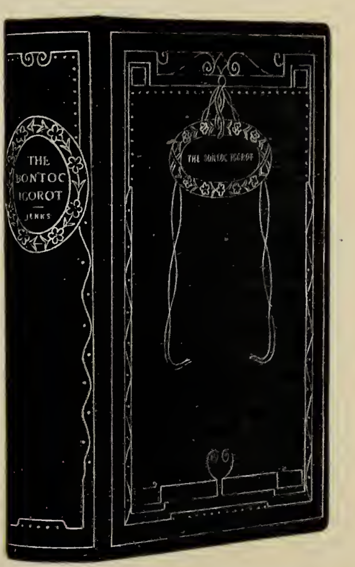


FULL-BOUND RUSSIA, EXTRA HUBS

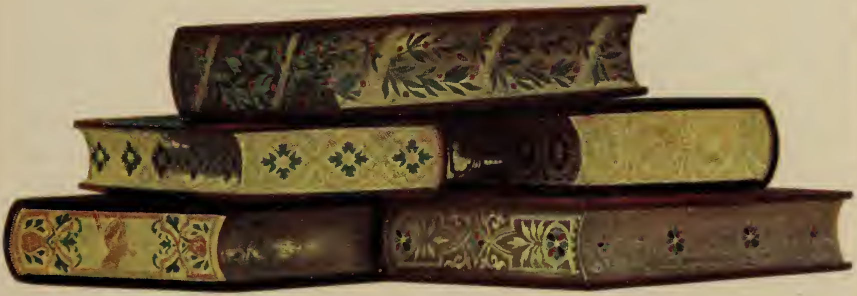
REPRODUCTIONS OF BOOKBINDINGS IN NATURAL COLORS



FULL SHEEP



FULL LEVANT MOROCCO,
HAND TOOLED



GILT-EDGING, ORNAMENTAL DESIGNS

THESE TWO PAGES OF COLORED PLATES WERE REPRODUCED DIRECT FROM THE OBJECTS BY THE THREE AND FOUR COLOR PROCESS OF ENGRAVING. THE PLATES WERE ENGRAVED AND PRINTED BY APPRENTICES AND GRADUATE APPRENTICES OF THE BUREAU OF PRINTING, UNDER THE SUPERVISION OF AMERICAN CRAFTSMEN INSTRUCTORS. THE SAME CLASS OF WORKMEN, UNDER THE SAME WORKING CONDITIONS, BOUND THE BOOKS WHICH ARE THE SUBJECTS OF THE ILLUSTRATIONS

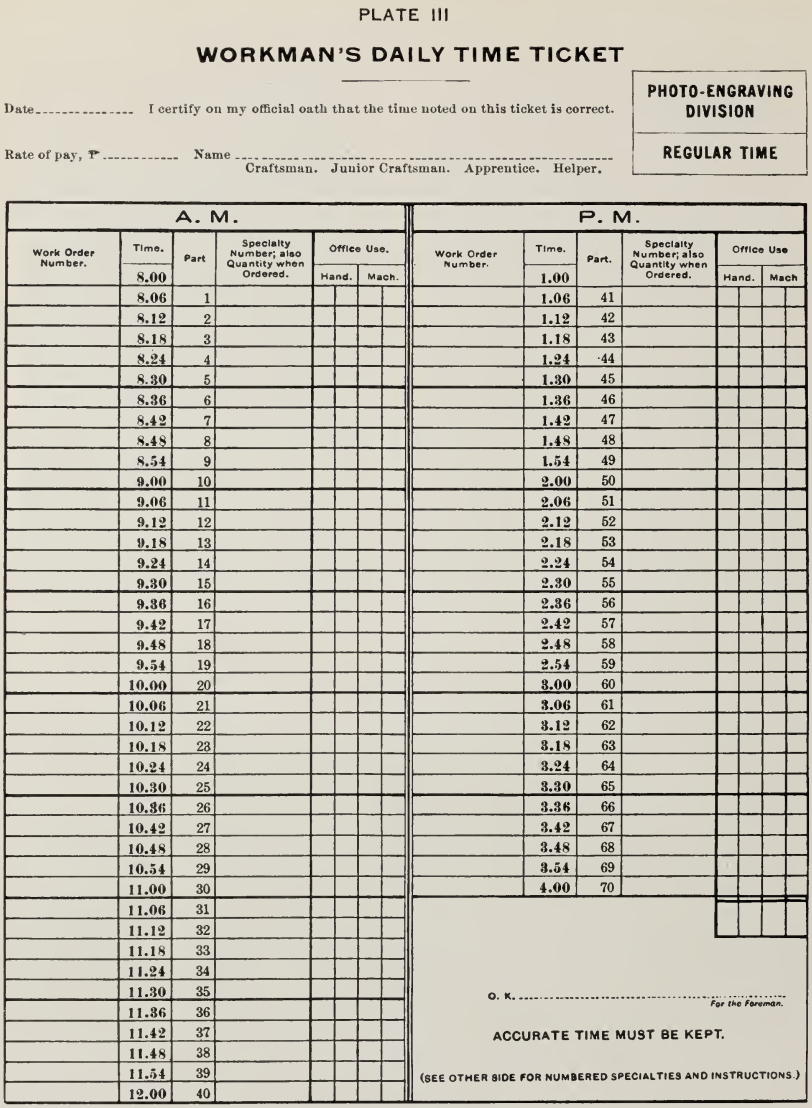


PLATE III

WORKMAN'S DAILY TIME TICKET

PHOTO-ENGRAVING DIVISION

REGULAR TIME

Date.............. I certify on my official oath that the time noted on this ticket is correct.

Rate of pay, ₱.......... Name ....
Craftsman. Junior Craftsman. Apprentice. Helper.

A. M.								P. M.							
Work Order Number.	Time.	Part	Specialty Number; also Quantity when Ordered.	Office Use.				Work Order Number.	Time.	Part.	Specialty Number; also Quantity when Ordered.	Office Use			
	8.00			Hand.		Mach.			1.00			Hand.		Mach	
	8.06	1							1.06	41					
	8.12	2							1.12	42					
	8.18	3							1.18	43					
	8.24	4							1.24	44					
	8.30	5							1.30	45					
	8.36	6							1.36	46					
	8.42	7							1.42	47					
	8.48	8							1.48	48					
	8.54	9							1.54	49					
	9.00	10							2.00	50					
	9.06	11							2.06	51					
	9.12	12							2.12	52					
	9.18	13							2.18	53					
	9.24	14							2.24	54					
	9.30	15							2.30	55					
	9.36	16							2.36	56					
	9.42	17							2.42	57					
	9.48	18							2.48	58					
	9.54	19							2.54	59					
	10.00	20							3.00	60					
	10.06	21							3.06	61					
	10.12	22							3.12	62					
	10.18	23							3.18	63					
	10.24	24							3.24	64					
	10.30	25							3.30	65					
	10.36	26							3.36	66					
	10.42	27							3.42	67					
	10.48	28							3.48	68					
	10.54	29							3.54	69					
	11.00	30							4.00	70					
	11.06	31													
	11.12	32													
	11.18	33													
	11.24	34													
	11.30	35													
	11.36	36													
	11.42	37													
	11.48	38													
	11.54	39													
	12.00	40													

O. K. ....
For the Foreman.

ACCURATE TIME MUST BE KEPT.

(SEE OTHER SIDE FOR NUMBERED SPECIALTIES AND INSTRUCTIONS.)

Upon beginning work, the employee enters the work-order number and the specialty number in the respective columns. If the time of beginning is 8 o'clock, the work-order and specialty numbers are entered opposite the first part or period—8.06 o'clock. Each period consists of six minutes, and the time printed is the last minute of the period. Should work on a different specialty on the same work order be started at 8.30 o'clock, then that specialty number is entered in the space directly opposite 8.36. One entry of a work-order number is sufficient, and this entry is made at the time of beginning a new work order. It is not necessary to mark off the time on this ticket, as the form has been ruled to obviate such work. All numbers must be carefully verified.

PHOTO-ENGRAVING DIVISION

WORKMAN'S DAILY TIME TICKET

SPECIALTIES

Chargeable

1. Alterations.
2. Anchoring.
3. Beveling, plain.
4. Beveling, special (lining).
5. Blocking or mounting.
6. Cutouts.
7. Cutting circles or ovals.
8. Drawing (illustrating, designing, lettering).
9. Etching, copper, half-tone.
10. Etching, copper, line.
11. Etching, half-tone, color.
12. Etching, zinc, half-tone.
13. Etching, zinc, line.
14. Finishing, half-tone.
15. Finishing, half-tone, color.
16. Finishing, line.
17. Mortising.
18. Mounting or grouping original copy.
19. Photographing, color operating; making color record negatives.
20. Photographing, dry-plate work.
21. Photographing, half-tone.
22. Photographing, half-tone, special (reproduction of pencil drawings, etchings, and steel or copperplate prints).

Chargeable—Continued

23. Photographing, line.
24. Printing negatives.
25. Proofing.
26. Reëngraving.
27. Retouching.
28. Routing.
29. Stripping negatives.
30. Transparencies.
31. Vignetting.
32. Zinc overlays.

Nonchargeable

101. Cleaning machinery.
102. Corrections, office.
103. Instructing apprentices.
104. Laborer.
105. Mixing and preparing chemicals.
106. Practice work.
107. Supervising, inspecting finished product, and similar work.
108. Waiting for repairs (write name of machine).
109. Waiting for work (will not be allowed unless employee reports immediately to the foreman).

DESCRIPTION OF WORKMAN'S DAILY TIME TICKET

Arrangement.—The face of the ticket contains a complete record of the day's work, as well as all data pertaining to the compensation and status of the workman. This information is valuable to the instructor in determining the rating for "quantity" and to the inspector or computer in cases of excessive time. It enables the abstractor to complete and total all entries at a glance.

Sexagesimal notation.—Calculations are greatly simplified by dividing the time into six-minute periods, or the hour into tenths. The abstractor is further aided by reason of the heavy line under each fifth period, which divides the workday into half-hour periods.

Advantages of the printed horizontal lines.—The original Bureau of Printing time tickets were printed without horizontal lines under the different periods. These were drawn by the workman upon the completion of each work order or specialty. This work was not only objectionable to the workman, but the completed ticket, particularly for small work, was in many cases so badly accomplished and soiled as to greatly increase the work of abstracting. The elimination of this work through the printing of the horizontal lines has reduced the number of entries to the minimum.

The "Part" column.—The "Part" column enables the abstractor to determine at a glance how many tenths of an hour are consumed. The value of this time for any wage is quickly obtained by referring to a prepared table of computations, with the different rates of pay as headings of columns and the parts from 1 up as a guide column.

How to obtain quantity.—It is necessary at times to know the quantity of production. Provision is made for such information in the "Specialty" column.

Specialties, and how numbered.—Plate I shows the manner in which specialties are numbered. As all data required for abstracting purposes are shown on the face of the ticket, this system enables one Filipino clerk to abstract the daily time tickets of several hundred workmen.

(Owing to limited space, only a reduction of the front of the time ticket is shown on the opposite page. The actual size of the ticket is 7 by 8½ inches. The reverse sides of originals contain detailed instructions relative to making out the ticket, as well as a complete list of specialties of each mechanical division. Plates I, II, and III refer to photo-engraving operations.)

How chargeable time is gathered.—Chargeable hours only are gathered unless information is desired on a nonchargeable specialty. The total of nonchargeable hours is obtained by subtracting the gathered chargeable hours from the pay-roll hours.

Miscellaneous advantages of a time ticket.—It constitutes the most accurate record of a workman's efficiency.

It is the only means of accurately determining the cost of the individual job.

It is indispensable in formulating a scale of charges, for without reliable data as to costs the fixing of charges would be mere guesswork.

It provides accurate information relative to the status of a work order.

able to classify and make allowances for the idiosyncrasies of the boy in his charge. He must be able to determine, at the expiration of the first class period of apprenticeship, whether his charge is fitted to continue at the trade to which he is assigned. Inability to comprehend mechanical details, continued indifference, failure to make an honest effort to take advantage of the craftsman's instructions, and perfunctory performance by listless "time servers" are carefully noted. Such delinquents are separated from the service to make room for applicants who will show more interest in their work.

A Stage of Binding Called Forwarding

Strict discipline is maintained at all times. Upon entrance each apprentice is given a pamphlet containing the office rules. Infractions of the rules and cases of carelessness and insubordination are made a matter of record. Verbal reprimands by craftsmen instructors are not permitted. Adverse reports in the form of letters of reprimand are sent to the offending employees, who are given opportunity to make statements in their own behalf. Adverse reports are also made in cases of errors which are manifestly due to carelessness or inattention. These reports are filed, and when the employee's efficiency record is compiled a deduction is made for each. Letters of commendation are given to apprentices for exceptionally meritorious work.

Instruction in the operation and the ordinary adjustment of machinery is imparted by the immediate instructor, while the technical knowledge of a machine and its parts is acquired from the chief machinist. All power-driven machinery of the Bureau of Printing is inspected three times a year, according to a dated schedule. Two of these inspections are made for the purpose of reporting on the condition in which machinery is cared for by the operator, and at the third inspection the machine is completely overhauled for purposes of instruction.

The Bureau of Printing Desk Book is the only technical publication used in connection with apprentice instruction. It has been indorsed by American and foreign publishers and is recognized as a standard work of reference in the printing trades.

For the information of all employees—apprentices, junior craftsmen, and craftsmen—a comprehensive list of technical terms and definitions peculiar to each trade is posted in a conspicuous place and is accessible at all times. With these definitions, printed instructions are also provided relative to the performance of the more intricate operations of each trade.

The Difficult Process of Finishing

Each apprentice is orally examined by his foreman as to his knowledge of such terms and definitions, and none is promoted who does not possess information to the extent of securing a passable rating.

Apprentices are required to attend a public night school in English unless excused by the Director of Printing. Excuses are granted in those cases in which apprentices may wish to receive instruction in a private school or from a private tutor, when they have completed the intermediate course of study prescribed by the Bureau of Education, or when they satisfactorily pass a test in English. All apprentices who have been excused from night-school attendance are required to continue the reading of standard English literature and to render a monthly report thereof, in writing, to the Director of the Bureau of Printing.

Where the art of printing remains undeveloped, the common people exist in a condition of serfdom, for their ignorance, prejudice, and superstition require the placing of their political destinies in the hands of the few

After an employee has assumed the duties of a craftsman, additional responsibilities are placed upon him and every effort is made to inspire him with the confidence necessary to enable him to act in a minor executive capacity, such as assistant to the foreman or in charge of a group of workmen.

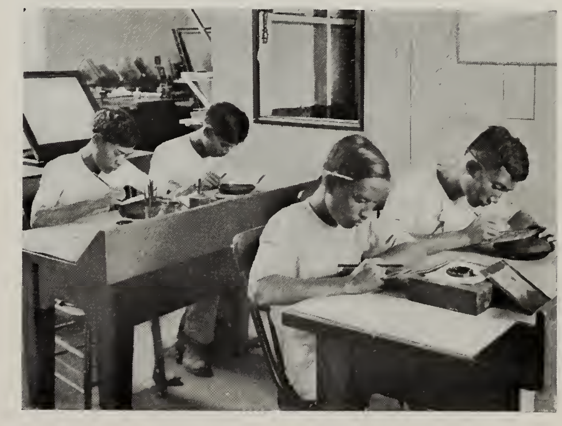
Apprentices are selected for appointment from lists of eligibles certified by the Bureau of Civil Service of the Philippine Government. In making selections, physical as well as educational qualifications are taken into consideration. The educational test is a simple one, given in either English or Spanish, and is waived in the case of graduates of intermediate and high schools. Those taking the Spanish examination must possess at least a slight knowledge of English. The examination is known as the third grade, and comprises the following subjects and weights: Spelling, 20; arithmetic, 20; letter writing, 20; penmanship, 20; copying from plain copy, 20; total weights, 100. To be eligible for appointment, applicants must obtain an average rating of 70 or more. Minimum and maximum age limits are 15 and 20 years, respectively. Each appointee must be in good physical condition and must weigh not less than 46 kilos (112 pounds) and be at least 155 centimeters (5 feet 1 inch) in height. His general fitness for an indoor occupation must be unquestioned.

Electrotyping and Stereotyping Division

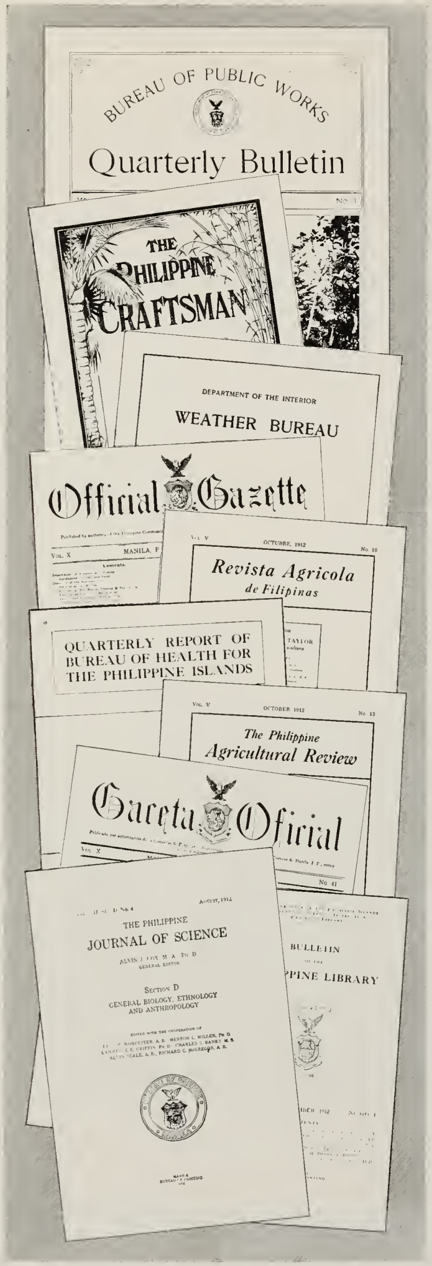
The product of the printing press is indispensable to every literate member of the human family. Without it, the world would stagnate, history would become tradition, and posterity would be robbed of its inheritance

Apprentices are rated on quantity of work; quality of work; aptitude and adaptability; habits, character, and conduct; and attendance and physical condition. Promotions from one class to another are made when the apprentice has qualified in all the specialties included in his current class. The Bureau's daily time ticket, a facsimile reproduction of which is shown in Plate III, page 12, is useful in determining the rating for quantity. The apprentice must have completed the full period of six months, as the class period is extended in an amount of time equal to that which may have been lost for any cause whatsoever.

Prior to promotion at the end of every class period and before graduation to craftsmanship, each apprentice is required to go to the examination room and, aided only by memory, write in English a theme on one or more subjects pertaining to his past or current work. A successful test of this nature not only demonstrates a workman's capacity to assimilate technical knowledge of a trade but also indicates the clearness with which he can impart his ideas to others.


Finishing Half-tones and Etchings

The printing law of the Philippine Islands provides that native apprentices, from the date of their entrance into the third year of apprenticeship, for each year of honest, faithful, satisfactory, and continuous service in the Bureau of Printing,


BUREAU OF PUBLIC WORKS
Quarterly Bulletin
THE PHILIPPINE CRAFTSMAN
DEPARTMENT OF THE INTERIOR
WEATHER BUREAU
Official Gazette
OCTUBRE, 1912
Revista Agricola de Filipinas
QUARTERLY REPORT OF BUREAU OF HEALTH FOR THE PHILIPPINE ISLANDS
OCTOBER 1912
The Philippine Agricultural Review
Gaceta Oficial
THE PHILIPPINE JOURNAL OF SCIENCE
SECTION D
GENERAL BIOLOGY, ETHNOLOGY AND ANTHROPOLOGY
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shall be entitled to receive, at the end of the next succeeding year of honest, faithful, satisfactory, and continuous service, extra compensation as follows: Twenty centavos per diem for each full day of actual service rendered at a daily wage of ₱1.20 or more but less than ₱2.40; 40 centavos per diem for each full day of actual service rendered at a daily wage of ₱2.40 or more but less than ₱3.20; and 60 centavos per diem for each full day of actual service rendered at a daily wage of ₱3.20 or more. An apprentice separated from the Bureau of Printing after such extra compensation has been earned and before it becomes due shall not be entitled to receive any part thereof unless such separation shall be on account of lack of work, permanent disability, or death, in which event such apprentice, or his estate in case of death, may, on the recommendation of the Director of Printing, approved by the Secretary of Public Instruction, receive the extra compensation accumulated at the time of separation. The law further provides that the services of such apprentices shall be deemed continuous until such apprentices are definitely separated from service in the Bureau of Printing.

The per diem compensation and bonus of apprentices, junior craftsmen, and craftsmen are as follows:

Designation.	Wages.	Bonus.
Class 6	₱0.80	None.
Class 5	.90	None.
Class 4	1.00	None.
Class 3	1.20	None.
Class 2	1.40	₱0.20
Class 1	1.80	.20
Junior craftsmen	2.25	.20
Craftsmen	2.50	.40

It will be noted that no extra compensation (bonus) is allowed until the completion of the second year of apprenticeship.

The Bureau of Printing has been a vocational school of the best kind for the Filipinos who have entered its service. They have learned the value of continued and earnest application to one of the most useful of arts, and to seek for superiority and excellence in their work. While the Bureau has been indispensable in the effective performance of the work of the Government, yet it has

Various Kinds of Blank Books

had even greater value as a training school for the Filipinos. It has been effective in improving the art of printing throughout the Islands and has also been a most useful instrumentality in extending the use of the English language through its dissemination by the intelligent and progressive young Filipinos who go from its service to engage in enterprises of their own or as the employees of others.

The success which has attended the technical training of apprentices in the Bureau of Printing has demonstrated beyond peradventure that the application of *system* to vocational training will produce efficient workmen in *any* of the skilled trades.

The Bureau of Printing was established in 1901 upon the recommendation of the Governor-General of the Philippine Islands. The Secretary of War selected Mr. John S. Leech, of Illinois, a division chief in the Government Printing Office, to prepare complete specifications for a plant equipped for every operation known to letterpress printing. These were presented by Mr. Leech to the War Department within three months, when the first shipments of equipment and supplies were made. The continuity of his Philippine service has been interrupted but once, when, in 1908, he was transferred by the President of the United States to effect the reorganization of the Government Printing Office at Washington. In that institution he substituted modern business procedure for obsolete methods and provided, for the first time in the history of that office, a uniform scale of printing charges which admitted of but one interpretation and placed all participating requisitioners on an equal basis.

The instructions to the Philippine Public Printer included not only the installation of a plant to handle the Government work but also required the instruction of Filipinos in the printing trades. This has been accomplished through the system herein described, and, of the various governmental activities with which he has been identified during twenty-four years' service under the American Government, Director Leech considers the Bureau of Printing system of coöperative vocational training his most effective work.

COMMENTS ON THE SYSTEM

THE SUBJOINED EXTRACTS ARE TAKEN FROM LETTERS RECENTLY RECEIVED FROM MEN WHO ARE ACTIVELY INTERESTED IN INDUSTRIAL EDUCATION BOTH IN SCHOOL AND WORKSHOP

It seems to me that you have found the correct answer to apprentice instruction. The work you are doing ought to have a most wholesome effect upon vocational training the world over. I am sure that it will have such an effect.—*R. J. Aley, President University of Maine.*

I have examined the system with a great deal of pleasure and congratulate you upon the splendid work you have done. You have inaugurated an unusual vocational-training school, the test of efficiency and practicability of which is the output of your school.—*Carleton B. Gibson, President Mechanics Institute, Rochester, N. Y.*

Somebody put in an amazing amount of work on the whole system of instruction in your plant. It looks to me as though you had worked out an extremely practical and progressive course of instructions.—*Herbert L. Baker, Graduate School of Business Administration, Harvard University.*

I have gone over the system with great interest and profit. It seems to me that your method of preparing, in the Bureau of Printing, by a four years' vocational course, young men who will be responsible as leaders in this work, is by all means the best that I know of.—*F. D. Crawshaw, Professor of Manual Training, University of Wisconsin.*

The principles are worthy of close attention. Not only the systematic course of practice and study, but the wonderful divisions of the records, prove how teaching has recognized that the work of printing and its allied industries comprise infinite detail of the highest importance. In fact, until one notes the divisions set forth, it is scarcely credible that such an enormous range of step-by-step progress is not merely useful but necessary to the growth of the full-grown craftsman.—*The British Printer, London, England.*

You have worked out, it would seem to me, the ideal relation between the commercial and the educational sides of a great industrial establishment. I congratulate you heartily upon your great educational achievement. It is unique. No one can appreciate better than I what a tremendous task you have accomplished. There is perhaps one tentative criticism that I would make, and that is, the use of the word "apprentice," which very inadequately describes your instruction. You have surely given that word a new meaning, and your system of instruction is much more than what is usually understood as "system of *apprentice* instruction." There is a give and take between the student-workman and workman-teacher, and it is possible that the word "coöperative" might better describe your instruction.—*Fred W. Atkinson, President Brooklyn Polytechnic Institute.*

I am confident that your Bureau is doing excellent work, and I am in full sympathy with its purpose.—*Adlai E. Stevenson.*

There is, of course, a very big question underlying the scheme, as in effect you are aiming to build up a self-reliant, properly educated nation and to evolve it from the chaos of the past. Your apprenticeship question itself is very fully worked out.—*Hon. W. A. Gullick, Government Printer of New South Wales.*

You are certainly doing a splendid and lasting work in the Philippine Islands, especially in giving practical instruction to the Filipinos, and their work shows that they are taking advantage of their opportunities. We are here just beginning industrial training in our schools, and your system will be of great interest to those of us who are specially interested in that work.—*George R. Colton, Governor of Porto Rico.*

I consider the methods there the most comprehensive, thorough, and practical of any apprentice instruction given in any institution where production is of necessity the prime object. The specialties are arranged in such order of sequence as to afford equal pedagogical and operative value. Their products are to be used, and hence their efforts become virile and finally make for perfection. I think Mr. Leech should be congratulated, not only upon a system of instruction whereby greater technical efficiency may be secured for the Bureau of Printing, but for the larger public service he has rendered the Islands and the world generally in the cause of education.—*Extract from report of A. A. Thomas, Instructor in Printing, Tuskegee Institute, to Booker T. Washington, Principal.*

You are doing in Manila, and in the Bureau of Printing there, just what we need to be doing in the United States if we are to hold the high position we have had in industrial progress. You are doing in Manila, and probably doing better, what Germany has been doing for twenty years with increasing efficiency, but what the United States has hardly begun to do. Such relation as I have had to your system of instruction gives me the feeling that it is admirably devised and that its practice is well carried out. Such evidences as I have seen of the work turned out show me that the result of organized, systematic instruction is vastly superior to the result attained under the haphazard methods of modern apprenticeship handling. I am going to make further study of this material and shall take great pleasure in using it with proper credit on the occasion of next year's incumbency in the Harvard course in printing.—*J. Horace McFarland, Graduate School of Business Administration, Harvard University.*

This is an excellent school plan.—*David C. Barrow, Chancellor University of Georgia.*

We commend the thoroughness with which you have gone into the matter of apprentice instruction.—*Henry P. Kendall, of the Plimpton Press, Norwood, Mass.*

I wish to congratulate you upon your success in developing such a degree of taste and skill among the youth of the Philippine Islands.—*John P. Brooks, Director Clarkson School of Technology.*

You are to be congratulated on having dealt so successfully with a difficult problem. Your system, as outlined, is one concerning which I do not find criticisms or suggestions to make.—*C. A. Duniway, President University of Wyoming.*

I congratulate you on introducing such an effective system in such a satisfactory way. I have gotten a number of ideas from this work which I hope to be able to use in some other connections.—*R. M. Hughes, Acting President Miami University.*

It is all very interesting and shows that a great amount of time and thought has been expended in order to bring into action so complete a system. It is an unquestionable fact that in any trade the man who is familiar with all branches is the one best equipped for general work. These, however, are days of specialization in everything, and commercial economy is sometimes obtained at the expense of general utility.—*Alba B. Johnson, President Baldwin Locomotive Works, Philadelphia.*

I am greatly interested in the account of the system of printing apprentices which you have put into effect at Manila. I wish with all my heart that I were able to make comments that would be of service to you in the further development of the work. Unfortunately, any suggestions to be of practical value would have to be based on study of the specific conditions that exist in the Philippines; so that I must content myself with deriving information without undertaking to give it.—*Arthur T. Hadley, President Yale University.*

The outline of the course and the means for putting it into effect are thoroughly sound and practical, as is evidenced by the results achieved. This outline contains so much detail information that it is impossible, without more complete study, to offer any suggestions, but I am impressed with the thought that if this outline of instruction could be supplemented by sufficient required academic and applied scientific studies, given preferably in the existing schools, it should prove most effective in solving one of the most difficult vocational tasks which have confronted educators recently. The typographical industry of printing has been almost wholly neglected, and I am very glad indeed this experiment has been made under Governmental auspices to guide us in our proposed plan to inaugurate at the Carnegie Institute of Technology a course of instruction in the printing art.—*Arthur A. Hamerschlag, Director Carnegie Institute of Technology, Pittsburg, Pa.*

You are certainly making great head, and I congratulate you on your achievements.—*Elbert Hubbard.*

The subject-matter is at once interesting and the result surprising.—*Wm. P. Palmer, President American Steel and Wire Company.*

In our judgment, it is really the foundation of good manufacturing.—*A. W. Eaton, President Eaton, Crane & Pike Co., Pittsfield, Mass.*

Certainly you have worked out an interesting method of dealing with the instruction in trades.—*Frank L. McVey, President University of North Dakota.*

This demonstrates to me that you have a very broad grasp of this training proposition.—*A. M. Glossbrenner, President of the United Typothetae of America.*

Judged by the only proper standard, that of results, your system merits the highest praise that can be bestowed upon it.—*Levi C. Conant, Acting President Worcester Polytechnic Institute.*

To me this is very interesting and is a valuable contribution to industrial education. I congratulate you upon your plan of operation and upon the success that has already attended your efforts.—*F. B. Gault, President University of South Dakota.*

Your apprenticeship instruction seems to me a very thorough system and one that should make the men efficient. I am afraid that it will be a long time before we can have the command over our material that you appear to have.—*C. H. Johnson, Secretary of the London County Council Camberwell School of Arts and Crafts, London, England.*

It seems to me that the Bureau of Printing is doing a great work in educating Philippine workmen in all branches of the printing trade, and I believe that the system which has been worked out there will also prove of value in American printing schools. Under present-day conditions the old apprenticeship system has proven a failure.—*Lewis C. Gandy, Editor of The Printing Art.*

Your system of apprenticeship instruction assists in opening the view still further into one of the most interesting phases as well as one of the most troublesome problems of the printing business. Such examination as I have given the data and forms leads me to believe that it will be of the greatest assistance in the formulating of plans for the instruction of apprentices.—*C. D. Traphagen, Lincoln, Nebr.*

Let me "lift my hat" in admiration to learn how one master printer sees so clearly a responsible duty due to his young helpers in a great industry and has so carefully planned to have that duty performed in a practicable and efficient manner. It will be a blessed day for American boys in the printing trade when their employers will plan and do for them as you have done for the Filipino boys.—*A. A. Stewart, Instructor in the Boston School of Printing, Boston, Mass.*

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